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Geology and gravitative evolution of the Chiotas landslide (Western Alps)

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The Western Alps are characterized by large landslides and deep-seated gravitational slope deformations (DSGSDs), which widely constrained the Quaternary evolution of valleys and mountain reliefs. Our work is focused in the Varaita Valley (Colle di Sampeyre area, Southern Cottian Alps), wherein a major landslide (i.e. the Chiotas Landslide, CL) has been investigated through a detailed description of its morphological and structural features. Kinematics, age and state of activity of the CL were defined by field surveys and aero-photo interpretation, and a model of the slope deformation was developed through detailed analysis of morphostructures. The bedrock of the CL is characterized by juxtaposition of different tectonics units, which corresponds to the Dora Maira continental Unit, the Monviso Meta-ophiolite Complex and the Queyras Schistes Lustrès oceanic Complex. The CL involved rocks of the Monviso Meta-ophiolite Complex and slip surfaces almost developed along sheared lithological contacts (e.g., the folded interface between massive serpentinite, meta-ophicarbonate and mafic metabreccia levels, and carbonate metasediments) and are bounded by first-order structures (e.g., the Colle di Sampeyre Fault). The CL involved the middle and lower sector of the slope and is linked to a more extended and active DSGSD.The main deformation mechanism of the CL is a deep creep, with surficial sliding mechanisms, which led to progressive loss of cohesion of rock masses.The deformation started during the Last Glacial Maximum, continued with the formation of the CL and the slope is now characterized by a low-activity. This condition is confirmed through interpherometric data provided by Arpa Piemonte.